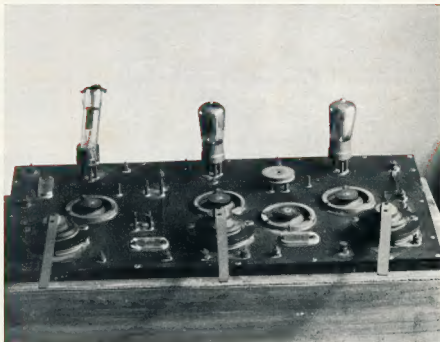


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JULY 1962



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Publications Committee:

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before the 8th of the month preceding publication. Technical articles should preferably be typed, double spaced, on one side of the paper, signed and numbered. All drawings should be large and done in Indian ink.

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★

OUR COVER

A modern DX receiver (vintage 1925) as used by Mr. Maxwell Howden to win the Trans-Pacific tests in May of that year, by logging 22 stations in the 150-250 metre band. When transmitting licences became available for that band, two-way contact was made in the following year by VK3BQ.

The handles in the front of the set are coupled to the home-made tuning condensers, ebonite being used to eliminate hand capacity. In the centre of the photo are the filament rheostats, also hand wound, and the coil can be seen in the centre top right hand corner. Three B.T.H. valves were used, and the one at the left has been mounted in what appears to be a glass test tube, sealed to the base with paraffin wax. How many Amateurs could today build their own tuning condensers?

FEDERAL COMMENT

★

At the recent Federal Convention in Perth, an item was placed on the agenda for consideration to be given to the purchase of land in Canberra by the Institute as a site for a future Federal Headquarters. This item was thoroughly discussed, and it was finally resolved that the Federal Executive should investigate the whole matter and report to the Federal Council on the possibility of such a venture.

This matter is naturally not one on which a hasty decision can be made as there are many problems involved, not the least among these being the question of finance, whether Canberra is the best place for a future Headquarters and many others. Perhaps the salient feature of this idea is whether it is desirable or not from a member's point of view. The Federal Council have thought so and have been forward-looking in this regard, and we feel that every member will support this view in that in the not-too-distant future a permanent home for the Institute Headquarters is necessary.

The saying—"Great oaks from little acorns grow"—is very apt in this sense. From small beginnings and a realistic future plan, one can visualise a similar growth to the presently strong A.R.R.L. organisation. And yet our American contemporaries, despite their growth and strength, are even now embarking on a further expansion in the accommodation for their League Headquarters. Our future expansion may not be so clearly predictable as it is with the A.R.R.L. because of our present organisation, but it is evident from other items discussed at the recent Convention that there is a gradual trend towards unification of the W.I.A. on a national basis. The two important items on the agenda dealing with a new Constitution confirm this trend, and when implemented may give a clearer indication of how we may attain our objective.

With the Institute's increasing growth in status of recent times, it is obvious that more cognisance must be given to our Federal structure if we are to survive and expand our activities. This scheme for finding a permanent home for our Federal Headquarters is a step in the right direction, and although the investigations are not likely to provide an early solution, we trust that when the time for action does come every member of the Institute will wholeheartedly support the Council in its final decision. As our planning of today may become the reality of tomorrow, we hope to provide the Amateur administrations of the future literally with a solid foundation on which to build and expand.

FEDERAL EXECUTIVE, W.I.A.

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SPLATTER—ITS CAUSE AND PREVENTION

J. G. REED,* VK2JR

RECENT articles in "Amateur Radio" dealing with sideband splatter caused by over-modulation are to be commended. All too frequently we hear stations with radio whiskers the proverbial yard wide fouling many kilocycles of our ever-decreasing bands.

Unfortunately, these articles and the correspondence they have evoked have been noteworthy in major part for their misunderstanding of the basic reason for the generation of such splatter. What Amateurs look for in "Amateur Radio" are factual explanations and bread-and-butter information as to a cure, as most have a limited time to operate and meagre facilities to carry out real experimental work.

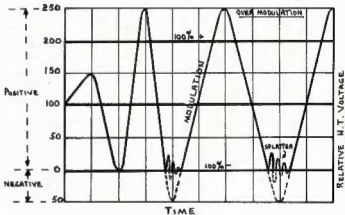
Generation of harmonics of the fundamental audio modulating frequencies plays a very minor part in the annoying signal spread caused by over-modulation. Unless subject to selective filtering in the speech amplifier, major energy level in radio telephone signals will be found well below 1,000 cycles per second, and harmonics of quite high order will be contained within a band scarcely distinguishable from the true information channel, and well within the normal selectivity curve of most receivers employed by Amateurs. The higher frequencies, which are responsible for most of the intelligibility of speech, have relatively low amplitude as compared to the former and the power level of their likely harmonics will be found correspondingly weak.

In this article, use will be made of such terms as modulator, modulated amplifier, and carrier wave, in the generally accepted meaning long associated with what is called amplitude modulation. Every single sideband, and those who have bothered to analyse seriously the art they have adopted as a plaything, know that the so-called amplitude modulated transmitter is really a generator of double sidebands, obligingly radiating an accurately centred heterodyne c.w. signal to help in resolving intelligible signals at the distant receiver. However, to simplify matters, let us assume that such a thing as amplitude modulation of a carrier really exists.

What we refer to as a modulator is really the final stage of an audio frequency amplifier, and the modulated amplifier a combination generator of high level r.f. power and most importantly, a high level mixer in which both r.f. and audio powers combine to generate the desired double sidebands. As the primary objective of this article is to explain what causes sideband splatter and show in a very practical manner how to go about curing this troublesome and illegal nuisance, let us have a look at the accompanying diagrams.

When the peak potential of the superimposed modulation equals that of the voltage of the h.t. d.c. supply to the modulated amplifier, we have what is referred to as 100% modulation, and

the average power of the so-called carrier and its sidebands as supplied to the radiator is 50% greater than that obtainable under c.w. conditions, or no modulation. If the modulator is capable of generating a greater peak potential than the h.t. supply, the peak appearing at the modulated amplifier on the positive half of the modulation cycle will be greater than double the unmodulated voltage, and conversely on the opposite swing, the anode of the modulated amplifier, momentarily, will be driven negative. As the cathode to anode path of the modulated amplifier depends on a varying flow of "one-way" electrons, there will be a sudden circuit interruption when the anode swings negative, and the load on the modulator correspondingly will be open circuited just as effectively as if a mechanical switch had interrupted the circuit. No longer will the modulation transformer have a relatively steady ohmic load into which to pump its alternating current output. This is shown graphically in Fig. 1.



① INDICATING SPLATTER GENERATION CAUSED BY OVER MODULATION

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Many who have attempted the measurement of resistance of a secondary winding of a high tension transformer using a simple low powered continuity tester will have experienced the mighty wallop given by the inductive kick of that winding when even a few milliamperes are suddenly interrupted. Something akin to this takes place when the output circuit of the modulator suddenly faces an open circuit no-load condition.

If the modulation transformer and associated parallel feed inductor formed a combination free of leakage inductance and distributed capacitance, interruption of external load would have any surge power dissipated through the anode paths of the modulator valves and distortion of audio wave shape would appear as a series of harmonics related to the frequency of the power

swing which caused the irregularity. This actually takes place, but is a minor contributor to splatter generation.

All of us who practise the unfortunately dying art of telegraphy, and if our transmitters are not protectively interlocked, have experienced the fire-works in the modulation transformer as we warm up to a "CQ" and have forgotten to short circuit the speech choke or modulation transformer secondary winding. The potentials generated by the shock excited windings may reach many thousands of volts with an almost certain chance of flashover and damage to this expensive piece of equipment.

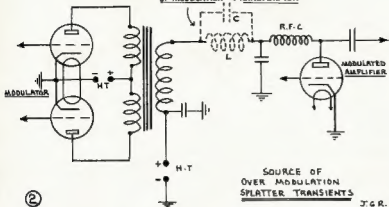
Fig. 2 illustrates in simplified form the circuit connection of a modulator to the modulated amplifier. Leakage inductance and distributed capacitance of the modulation transformer windings are shown by the lumped values "L" and "C". Old timers who have used the buzzer method of exciting an absorption wavemeter to generate modulated radio signals will immediately realise that this "L/C" circuit will

oscillate at its natural frequency if shock excited. The better the quality of the modulation transformer, the lower will be the leakage inductance and distributed capacitance, and the higher will be the unloaded shock-excited oscillation frequency.

Immediately the modulator drives the anode of the modulated amplifier into its negative and non conductive region, this hidden oscillatory circuit gets to work. From actual measurement and calculation, it has been found that frequencies as high as 25,000 to 50,000 cycles per second are generated, and as these are superimposed on the instantaneous value of the fundamental signal frequency of the transformer, the previously "flat-bottomed" anode current curve will be filled with a multitude of small positive signal peaks reminiscent of the damped wave oscillations orig-

* 57 Kameruka Rd., Northbridge, N.S.W.

EQUIVALENT
LEAKAGE INDUCTANCE
AND DISTRIBUTED CAPACITANCE
OF MODULATION TRANSFORMER



inating from an old time spark transmitter (as shown in Fig. 1). Depending on the relative energy content of this spurious "L/C" circuit and the amplitude of the fundamental over-modulation pulse, these splatter signals will persist, bearing no recognizable intelligible relationship other than a rhythmic association with the speech syllables of the speaker. Audio frequency harmonics of the fundamental speech frequencies have no causative association with what we hear as splatter.

What is needed is an automatic device which presents a load to the modulator during the negative over-modulation cycle. This will very effectively prevent the sudden interruption of alternating power through the windings of the modulation transformer, and shock excitation of the high audio frequency combination of leakage inductance and distributed capacitance will no longer take place.

The cause and cure of over-modulation splatter does not call for reams of pseudo-scientific obfuscation or specially designed heater transformers for surge protector diodes. There is available among the types of valves used in many television receivers a delightful simple solution to the problem. This valve is the type 6R3 or its slightly

larger equivalent 6AL3, used to prevent "ringing" or self oscillation of circuits associated with picture tubes. The problem of heating the cathode, which must be at high potential to earth is solved by a built-in insulation of heater from cathode which will withstand a peak voltage of up to 6,000 volts, which is more than enough to handle the positive peaks of over-modulation applicable to transmitters with up to 2,000 volts of h.t. supply. These valves have their cathodes taken out through a top cap, with the anode and heater connections to a nine-pin base.

A resistance load approximately equal to that of the modulated amplifier should be connected in series with the cathode.

If the modulated amplifier is normally operating with a loading of 100 milliamperes at 1,000 volts, the resistor should have a value of 10,000 ohms, or approximately the equivalent of this value. There is nothing critical about this value and the nearest wire wound unit will do. Do not attempt to connect it between the anode and ground as base pin and socket insulation may not be able to withstand the high potentials experienced during modulation. As this resistor is not subject to a continuous load, and only comes automatically into

circuit during peaks of over-modulation, its duty cycle will be low and something about 20% in rating as compared with the modulated amplifier power input will be found more than ample to handle the most chronic form of over-modulation.

Here are relevant characteristics for both 6R3 and 6AL3 valves:

	6R3	6AL3
Heater volts	6.3	6.3
Heater amperes	0.810	1.5
Dissipation (watts)	3.5	5
Peak anode current (mA.)	450	587
Aver. anode current (mA.)	150	2,200
Duty cycle (%)	22	22
Peak inverse volts	5,000	6,000
Cathode to heater positive volts	5,000	5,500

Pin connections: 1, 2 and 3—internal; 4 and 5—heater; 6, 7 and 8—internal; 9—anode; top cap—cathode.

Fig. 3 illustrates the schematic connections for this most useful valve which may be purchased for about the cost of a standard receiving valve at any t.v. or valve supply shop.

The famous Lord Kelvin once said: "When you can measure what you are speaking about and express it in numbers, you know something about it, and when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind. It may be the beginning of knowledge, but you have scarcely in your thought advanced to the stage of a science."

I would sincerely recommend Amateur station operators—it would be a misuse of terms to call them experimenters—to do a very thorough digestion of Lord Kelvin's famous remarks before bursting almost hysterically into correspondence column print in condemnation of this very effective method of sideband splatter prevention.



OSCAR II. LAUNCHED

All Australian Amateurs are requested to forward their report forms to the Australian Co-ordinator. Contact your V.h.f. Group for full details and copies of the report form.

Wireless Institute of Australia

Victorian Division

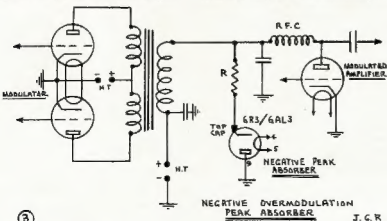
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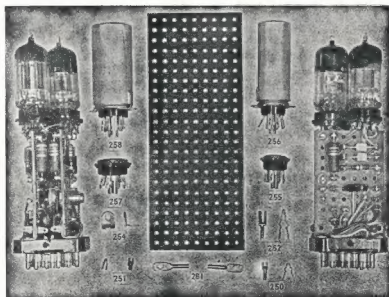
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MOBILE TRANSMITTER*

DESIGN FOR AMATEUR USE IN A CAR

C. J. SALVAGE, G3HRO

THE transmitter described here was designed to fit into the glove compartment of a Vauxhall "Cresta," it is not necessary to buy a new car if you don't have this model as the transmitter shape may be modified to suit individual requirements, provided that the general layout is not substantially altered.

R.F. AND CONTROL UNIT

The v.f.o. (V1) uses a 6AK5, with coils switched to work on the 1.8, 3.5 and 7 Mc. bands. To help obtain good stability all capacitors in the oscillator circuit should be silver-mica types. The output of the oscillator (V1) is taken via C8 to the grid of a 6F17 valve (V2) which, on 1.8, 3.5 and 7 Mc., provides little gain because of its un-tuned resistive anode load (R7). On 14 and 21 Mc., however, L4 is tuned to 7 Mc. to provide sufficient output for doubling or tripling.

The next stage, another 6F17 (V3), has its anode circuit similarly switched, but this time L6, L7 and L8 are tuned to the respective v.f.o. frequencies of 1.8, 3.5 and 7 Mc. L9 is tuned to 14 Mc., causing V2 to double from 7 Mc., while L10 causes tripling to give 21 Mc. L11 (tuned to 28 Mc.) doubles from the previously-doubled 14 Mc. The resistor R11 across L6 is included to reduce

drive and increase bandwidth on the 1.8 Mc. range.

If drive is found to be excessive on either 3.5 or 7 Mc. it may be found advisable to include damping resistors across L7 or L8 also. The drive control (VR1) is a 50K ohm potentiometer and is mounted immediately below the 500 μ A. meter. Grid drive at 60w. input should correspond to a current of about 2.6 mA., but at reduced power on the 1.8 Mc. band it should be 1 mA. Grid current through R14 (22K ohms) should, at full power, develop 57v. drop. As R14 is returned to the -12v. line the total grid bias is about 69v., which is sufficient to operate V4 in Class C.

Transmit-receive switching is accomplished by S3 (a double-pole double-throw switch) mounted at the bottom centre of the front panel. Its action is to change over the aerial from receiver to transmitter and divert the -12v. supply either to the receiver or the relay in the power-supply unit for switching of the d.c. supplies to the transmitter.

The "net" switch (S4) is a small micro-switch behind the front panel, actuated by a push-button mounted between the drive control and the T-R switch. This micro-switch applies -12v. to the 250v. d.c. converter only, which results in the energisation of the v.f.o. and driver stages so that the v.f.o. can be tuned to zero beat with the received signal. When switch S3 is moved to "transmit" both 250v. and 600v. supplies are energised from the 12v. supply.

The chassis is constructed from 18 s.w.g. aluminium and the panel is made from 18 s.w.g. brass, chromium plated.

METER

The 500 μ A. meter can be switched to read:—

1. Battery potential "on load." This is very useful for indicating when re-charging is required if the equipment is used for long periods with the car stationary.
2. H.t. potential (600v. line).
3. Grid drive to V4, the power amplifier. R15 is a shunt, giving an f.s.d. of 3 mA.
4. Power-amplifier current. R16 (0.6 ohm) in the cathode circuit of V4, provides a shunt giving 150 mA. f.s.d. In this position the meter reads, of course, screen current as well as anode current, but this connection does prevent the application of high voltages to the meter and switch, as would occur if anode current alone were to be measured.
5. Aerial match. Switched to this position, the meter is used to give a measure of the radiated power of the station. In the plastics housing of one of the rear-lights is fitted a short "probe" aerial wire. The signal picked up by this is rectified by a diode, the d.c. path being completed by a r.f. choke, and passed down a lead to the meter. The system is set up by adjusting the length of the probe (about 8 to 8 inches), once the aerial is correctly loaded, as shown by an r.f. ammeter

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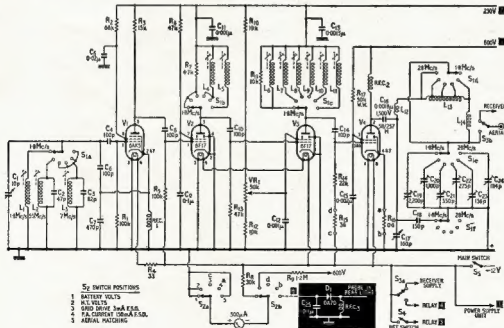


Fig. 1. Transmitter Circuit.

The Power supply enters through this unit for whole equipment. Small section in white-on-black is aerial-match monitor unit which is mounted in car rear-light housing.

(N.B.—Values of C24 and C25 are transposed on the diagram.)

temporarily connected in the coaxial lead. The adjustment is best made on the l.f. bands first.

MODULATOR

Fig. 2 shows the circuit of the modulator. As anode-and-screen modulation is extremely effective it was decided to use this method, making the modulator amplifier with transistors.

V6 and V7 are direct-coupled and have overall d.c. and a.c. negative feedback and the input stage (V5) is designed to match directly an electro-magnetic microphone.

The output impedance of T2 has to match the anode circuit impedance of the p.a. (V4) which is 6K ohms. The output is taken from the collectors of the two OC28s (V9 and V10) and is thus stepped-up by the transformer. VR3 sets the noisignal current in the collector circuit of V8: 250 mA. is the level chosen for the OC16 used, but substitution of the newer OC26 may render a slight change desirable, both in no-signal collector current and emitter resistor.

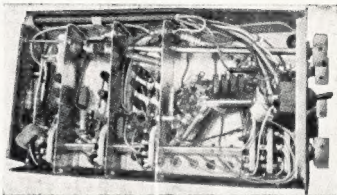
VR4 and VR5 are adjusted individually to set the quiescent collector currents of V9 and V10 to 30 mA. each. The photograph of the modulator shows V9 and V10 mounted on their heat sinks of blackened 16 s.w.g. aluminium.

The microphone is mounted on the steering column of the car and is of the balanced-armature variety (ex-Govt.). This was chosen as it matches the base impedance of V5 (about 300 ohms) and has high sensitivity. The modulator gives 25 to 30w. output in the audio frequency range required and is capable of modulating adequately the transmitter.

POWER SUPPLY UNIT

In the original article details were given of a commercial English transistor d.c./d.c. converter. Two of these units were used, one supplying 250 volts at 60 watts, and the other 600 volts at 60 watts. Readers are referred to "A.R." for October 1961 (page 3) wherein constructional details of transistor power supplies were given.

The three-core cable to the modulator can be seen in the photograph; two



Underside of Transmitter. At left (back of chassis) is v.f.o.; then are two amplifier-doublers and on right is power amplifier. Long extension spindle at the top of photograph is v.f.o. tuning capacitor, whilst hand-switch extends along bottom of picture.

cores are connected to the secondary of the modulation transformer and the remaining one is used for the 12v. supply, which returns via the chassis. As it is desired to energise the modulator only when the p.a. is operating, this supply is taken from the relay contact that feeds the 600v. converter. Two contacts are, of course, necessary so that the 250v. supply alone can be switched on by the net button.

A small socket on the power supply accepts the lead carrying d.c. from the serial-match indicator mounted in the rear light, and the connections to a six-way socket are as follows:-

- 1-Modulated 600v. supply.
- 2-250v. supply.
- 3-Minus 12v. (after S5 in Fig. 1).
- 4-Relay supply from the transmit-receive switch (S3 in Fig. 1).
- 5-Supply to 250v. converter from net switch (S4 in Fig. 1).
- 6-D.C. from the serial-match indicator.

Both the power-supply unit and the modulator are mounted together under the back seat of the car.

AERIAL

The aerial is an ex-Government, 12 feet long, tapered tank aerial, in three four-foot sections, mounted on the car's back bumper. On 28 Mc. only the two lower sections are used, and on 21 Mc. the whip is used at its full length, as it is on the other bands. Loading coils are inserted on the bands below 21 Mc. to improve matching and are placed in the joint between the bottom and upper two sections.

Loading Coils.-Fig. 4 gives details of the loading coils and their construction and the photograph shows the four coils.

The top and bottom connections of the loading coils fit onto the whip sections, so either the relevant ends of unwanted sections may be used, or a little fitting is necessary.

The ferrite rods are 4" long by 1" diameter and are Mullard's type No. FX 1356/B2. Their ends are taped to avoid chatter and a rod is "nicked" with a file, broken, and ground to length for the two h.f. coils.

The synthetic-resin-bonded paper (Paxolin) tube that fits round the fer-

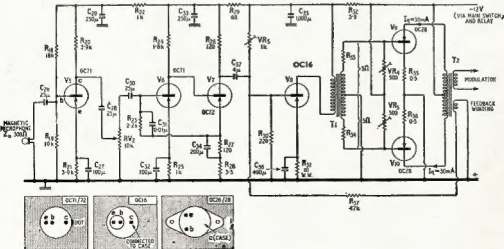


Fig. 2. Modulator Amplifier.

Old type of driver transistor (OC16) may be replaced by modern OC26. Supplies to modulator enter on three-core cable from power supply unit with which modulator is mounted. Microphone is wired separately back to steering column.

rite rod and provides the main mechanical strength is of 1" external diam. and is 6" long. The wall thickness is $\frac{1}{4}$ " and polystyrene inserts are arranged to fit between the tube and connections. A 4 B.A. screw passes through Paxolin and polystyrene into a brass insert fitted in the ends of the whip connections. The winding is mounted on six polystyrene ribs $4\frac{1}{2}$ " long by $\frac{1}{4}$ " thick by $\frac{3}{8}$ " wide glued to the Paxolin tube.

1.8 Mc.: 69 turns of 18 s.w.g. enamelled wire, close spaced.

3.5 Mc.: Grooves are cut in the polystyrene ribs at a pitch of 10/in. and 34 turns of 18 s.w.g. enamelled wire are wound on at 10 turns/in. spacing.

7 Mc.: For this coil the Paxolin tube is only $4\frac{1}{2}$ " long, the ferrite rod 2" and the ribs 2". The winding is 16 turns of 18 s.w.g. tinned-copper wire wound at 10 turns/in.

14 Mc.: Here the Paxolin tube is $3\frac{1}{2}$ " long, the ferrite rod $1\frac{1}{2}$ " and the ribs are $1\frac{1}{2}$ " long and have their width reduced to 9/16". Six turns of 16 s.w.g. tinned-copper wire are wound at 10 turns/in.

To check resonance of the whip aerial the appropriate loading coil is inserted between the bottom and upper two sections of the whip. A small one or two-turn coil of about $1\frac{1}{2}$ " diameter is temporarily connected between the bottom of the aerial and the chassis of the car. An accurate grid-dip oscillator is used against this coil and the loading coil is "pruned" to resonance at the l.f. end of the band. The temporary coil is now discarded and the 50-ohm coil from the aerial to the transmitter is fitted.

On the two l.f. bands it is necessary to make tapping points on the coils; these are found by loading the whip from the transmitter, starting at the l.f. end of the band and, as the frequency is increased, so the appropriate resonance positions are found on the coil by observing either a series ammeter or the aerial-match indicator. The established points on the coil can then be marked to correspond with the dial readings of the v.f.o. No tapping points are necessary on either the 7 or 14 Mc. coils.

Mounting.—As the Vauxhall's bumper is made in three parts it is possible to clamp the mounting plate between two of the bumper's sections; naturally other

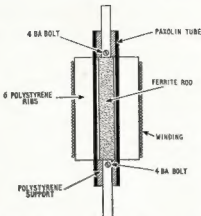
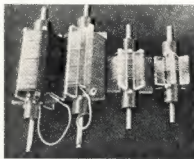


Fig. 4. Loading coil which fits between lower sections of whip. Details of dimensions, turns, etc., are given in associated text. Unit is supported by aerial rods, and connectors at top and bottom of unit must fit well into ends of aerial rods.



Four loading coils for whip aerial. 1.8 and 3.5 Mc. coils have tapping points made by flying lead and crocodile clip.

cars may necessitate slightly different arrangements.

The mounting is designed to have an impedance of 14 ohms, which is the value at the base of a correctly-loaded whip. It consists of an inner steel tube (the same material as the whip) about $7\frac{1}{4}$ " long, fixed by adhesive to a polystyrene tube of $\frac{1}{2}$ " inside diameter and 0.6" outside diameter, the tube being $6\frac{1}{2}$ " long. A piece of 20 s.w.g. alumin-

ium, $6\frac{1}{2}$ " wide, is formed round this and is clamped between two of the bumper's sections. Adhesive is also applied to the outside of the polystyrene tube.

A small brass ferrule is soldered to the top of the steel tube and a brass insert fitted at the bottom is drilled and tapped for connection of the coaxial cable inner. Earthing bolts for the cable's braid are fitted through the bottom edge of the aluminium plate.

Effect of Whip Variations.—It will be found in practice that the 12 ft. whip can be varied in length if required. The bottom section may be reduced to 2 ft. without serious detuning on the l.f. bands, although the position of taps on the loading coil may vary slightly. This shorter length is often advisable in town or under trees but does reduce the radiated signal by a small amount. If, on the other hand, space permits, it is possible to increase the bottom section to 6 ft. and thereby increase its effectiveness. This obviously applies to the l.f. bands only; if the whip length is changed on the h.f. bands the alteration will significantly affect resonance.

The transmitter output and aerial are mismatched; but on the grounds of simplicity a matching transformer is not incorporated. It will be found that the preset capacitors C19 to C24 should be re-adjusted, after the aerial has been tuned to resonance, to give maximum aerial current as indicated by the match indicator or a r.f. ammeter in the feeder.

POWER CONSUMPTION

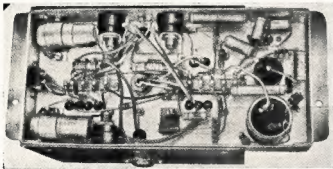
The transmitter and modulator together take a total of eight amperes at 12v. The current taken by the associated receiver is negligible but the transmitter heaters are, of course, left running when the installation is switched to "receive".

COMPONENTS SPECIFICATIONS

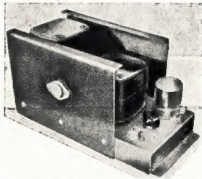
Resistors: $\frac{1}{2}$ w. 20% tolerance carbon types may be used in all positions except the following—

Transmitter—R16 (0.5 ohm). This is made up by winding wire on to a high value $\frac{1}{2}$ w. resistor. R17 (50K ohms) is a wire-wound type rated at 6w.

Modulator—R28 may be made up from two 6.8 ohm resistors in parallel. R32 (3.9 ohms) consists of a 6.8 ohm



Modulator—under-chassis view. VR2 (gain control) is available as a top-chassis control, but VR3, VR4 and VR5 (bias adjustments) are mounted on brackets under the chassis.



Top view of Modulator. Driver transistor, OC16 or OC31, is mounted between the transformers.

and an 8.2 ohm resistor in parallel. R33 and R34, see transformer section. R35 and R36 (0.5 ohm each) are made up by winding wire on to $\frac{1}{2}$ w. resistors of high value.

Transformers: Although these were made up there is no reason why suitable commercial alternatives (i.e. with characteristics not differing materially from those given here) should not be used.

Driver transformer, T1. This uses a "C" core, size 10/12/13, built up to a double loop. The turns ratio is 2:1 + 1, and the secondary is wound in the bifilar manner.

Primary inductance greater than 150 mH. at 250 mA. d.c., resistance less than 2 ohms. This winding consists of 200 turns of enamelled wire, 21 s.w.g.

Secondary resistance is 5 ohms each half, or is made up to this figure with R33 and R34, which may be made from a short length of resistance wire wound round a $\frac{1}{2}$ w. resistor. The winding is made up by taking two 32 s.w.g. enamelled wires and winding 100 turns of the pair of conductors.

Output transformer, T2. A larger "C" core, a double loop of size 10/24/13, is used for this. The turns ratio is 1 + 1:28. The primary inductance is greater than 25 mH. and the winding consists of 50 + 50 turns of 19 s.w.g. enamelled wire. The secondary has an inductance greater than 0.5 H. at 100 mA. d.c. and the winding is 1,400 turns of 36 s.w.g. enamelled wire. 50 turns of 36 s.w.g. wire form the feedback winding.

Suitable type cores are available from the local agents of English Electric and Telcon Magnetic cores.

Coils: L1 to L11 inclusive are wound on 0.3" diameter formers with grade 900 cores. (Aegis Manufacturing could supply a substitute coil former.) Coils on these formers are coated with polystyrene varnish to secure the turns.

L12, L13 and L14 form the pi output filter and are all in circuit for the 1.8 Mc. band, sections being progressively short-circuited for the higher-frequency bands. Tuning is accomplished by the trimmers C19 to C24; the fixed capacitor C18 and the p.a. tuning control C17.

Coil	Mc.	Details
L1, L6	1.8	About 80 μ H. wave-wound (pie 3/16" wide) with 40 s.w.g. d.s.c. to $\frac{1}{2}$ " diameter.
L2	3.5	76 turns, close wound, 38 s.w.g. enamelled.
L3	7.0	26 turns, close wound, 36 s.w.g. enamelled.
L4, L8	7.0	32 turns, close wound, 36 s.w.g. enamelled.
L5, L9	14.0	19 turns, close wound, 30 s.w.g. enamelled.
L7	3.5	80 turns, close wound, 38 s.w.g. enamelled.
L10	21.0	12 turns, close wound, 30 s.w.g. enamelled.
L11	28.0	8 turns, close wound, 30 s.w.g. enamelled.
L12	28.0	4 $\frac{1}{2}$ turns, 14 turns/in., 1" diam. air-spaced on polystyrene supports, 20 s.w.g. tinned copper. This coil is mounted near the top end of L13.
L13	21-3.5	23 turns, 14 turns/in., 1 $\frac{1}{2}$ " diam. on ribbed former 2 $\frac{1}{2}$ " long, 20 s.w.g. tinned copper. Mounted vertically, top-chassis. Tapping points at $\frac{1}{2}$ turns from L12-L13 junction for 21 Mc., $\frac{5}{8}$ turns for 14 Mc., 1 $\frac{1}{2}$ turns for 7 Mc.
L14	1.8	31 turns, close wound, 1" diam. Paxolin former, 20 s.w.g. enamelled. Mounted horizontally near L13 and L12.

Pi Output Filter: As will have been noted from the circuit diagram (Fig. 1) and the coil data, the output filter inductance is composed of sections of L12, L13 and L14 together, with preset tuning capacitors for each band and one variable capacitor. Approximate values of inductance and capacitance are given below for the various bands. The filter has an approximate impedance of 50 ohms.

Band Mc.	Capacitor (pF.)	Inductor (μ H.)
1.8	C17 = 310 C18 = 310 C19 = 2200	L12 = 28 L13 = 28 L14 = 28
3.5	C17 = 160 C20 = 1100	L12 = 14 L13 = 14
7.0	C17 = 80 C21 = 550	L12 = 7 L13 = 7
14.0	C17 = 40 C22 = 275	L12 = 3.5 L13 = 3.5
21.0	C17 = 26 C23 = 184	L12 = 2.3 L13 = 2.3
28.0	C17 = 20 C24 = 136	L12 = 1.7 L13 = 1.7

Switches: The room available for the band switch (S1) is considerably greater than on the receiver, also the switch has to handle high powers, especially in the output stage. It is thus a standard-size ceramic type with six single-pole six-position wafers. The meter switch (S2) must be of the break-before-make variety to avoid short-circuiting of the 12v. supply when changing function.

R.f. Chokes: Each choke is of 2.5 mH. inductance, wave-wound and split into pies. RFC2, the p.a. anode choke, is rated at 100 mA. d.c.

TECHNICAL ARTICLES

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Manuscripts should preferably be typewritten but if handwritten please double space the writing. Drawings will be done by "A.R." staff provided that the article is illustrated.



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Cer. No.	Call	Confirmations 144 Mc. 90 Mc.
1	VK3VO/T	100
2	VK3GG	114
3	VK3OV	185
4	VK3HE	162
5	VK3HE	118
6	VK3LE	112
7	VK3BE	300
8	VK3BO	122
9	VK3ABE	143
10	VK3ZAX	100
11	VK4ZBN	100
12	VK3FW	157
13	VK3AZ	847
New Members:		
14	VK3BQ	165
15	VK3V	118
16	VK4HD	104
17	VK4ADT	210
18	VK4ZBN	163
19	VK3BN	110
20	VK3ASZ	100
21	VK3XK	462

W.I.A. D.X.C.C.

Listed below are the highest twelve members in each section. New members and those whose totals have been amended will also be shown.

PHONE

Call	Cer. Cnt. No. Nies	Call	Cer. Cnt. No. Nies
VK3AB	45 266	VK3KW	4 208
VK3RU	2 263	VK3ATW	8 204
VK3AHO	51 253	VK4HR	12 192
VK3MK	43 252	VK4RW	23 184
VK3FH	18 250	VK3JL	39 178
VK3WL	14 211	VK4WF	16 176

G.W.

Call	Cer. Cnt. No. Nies	Call	Cer. Cnt. No. Nies
VK3KB	10 300	VK3BZ	8 222
VK3CX	26 288	VK3ATW	8 218
VK4FJ	26 269	VK3XU	48 213
VK3NC	19 255	VK3LZ	17 212
VK3FH	18 256	VK3JL	39 211
VK3RU	16 224	VK3AGH	71 204

New Members:

VK3XB	75 191	VK3KS	74 134
VK3RJ	42 184	VK3JF	70 142
VK3JXK	30 149		

OPEN

Call	Cer. Cnt. No. Nies	Call	Cer. Cnt. No. Nies
VK3ACX	6 300	VK3AGH	83 258
VK3RU	6 278	VK3HJ	3 241
VK4FJ	32 275	VK4HR	7 233
VK3NC	77 260	VK3BZ	4 231
VK3MK	74 256	VK3JL	45 229
VK3AHO	70 256	VK3WL	45 225

Amendment:

VK3TL	83 110
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A NOVEL METHOD OF BANDSPREADING

T. A. BRINKLEY,* VKISG

IN designing the tuning circuit of a receiver the most suitable variable condenser available is the starting point. Coils can be made to any exact practical value, and a fixed condenser in parallel with the tuner gives some control of coverage, and therefore bandspread.

Once the tuning range is decided on there is, for a variable condenser of given maximum and minimum capacity, only one value of inductance, and one value of fixed capacity, which can be employed if the chosen range is to fit exactly within the limits of the condenser.

These values can be easily computed, thereby saving lengthy fiddling with the inductance and fixed capacity—a process which is not only time consuming but is often concluded in exasperation, with unwanted coverage still remaining at one or both ends, and consequent loss of bandspread.

Both maximum and minimum values of the variable condenser must be known, and the writer commends that they should be measured before starting, since he bought from one well known shop a new condenser forty per cent. in excess of its advertised value.

The method is easiest explained by an example, using the case of an 80 metre receiver having coverage to allow the use of separate converters.

The tuning condenser available had a minimum capacity of 10 pF. and 60 pF. maximum. Coverage was chosen to be from 3.5 Mc. to 3.90 Mc.

From the formula $LC = 25330 \div f^2$

where L is inductance in μH .

C is capacity in pF.

f is frequency in Mc.

$LC = 2128$ for 3.45 Mc.

$LC = 1665$ for 3.90 Mc.

and C is the total circuit capacity comprising the tuning condenser (C1), the fixed condenser (C2 plus C3) and strays (C4).

At the 3.45 Mc. end of the range, 60 pF. is supplied by the tuning condenser and the remainder, as yet unknown, is supplied by the fixed condenser and strays.

If the total unknown capacity is denoted by x, we then have the capacity $x + 60$ pF. for 3.45 Mc., and $x + 10$ pF. for 3.90 Mc. There are now two equations:

$$L(x + 60) = 2128 \quad (1)$$

$$L(x + 10) = 1665 \quad (2)$$

Subtract equation (2) from equation (1) to get rid of one of the unknown x, then

$$L(x + 60) - L(x + 10) = 2128 - 1665$$

$$\text{or } Lx + 60L - Lx - 10L = 463$$

$$\text{hence } 50L = 463$$

$$L = 9.26 \mu H.$$

The total fixed capacitance, x, is now found by substituting 9.26 for L in

one of the original equations. Take equation (1):

$$\text{then } L(x + 60) = 2128$$

$$\text{or } Lx + 60L = 2128$$

$$\text{or } 9.26x + (60 \times 9.26) = 2128$$

$$\text{or } 9.26x - 2128 = 555.6$$

$$\text{hence } x = 1572.4 \div 9.26$$

$$= 170 \text{ pF.}$$

The only way to share this 170 pF. between fixed capacity and strays is to assume about 40 pF. for strays and use a mica condenser of about 140 pF. and an air trimmer in parallel with it.

When the circuit is wired it is only necessary to turn the tuning condenser to one of its limits, set a reliable oscillator to 3.45 or 3.90 Mc., as appropriate, and vary the trimmer until resonance is seen on the v.t.v.m. If the mica condenser is too high or too low to allow the value of fixed plus stray capacity = 170 pF. to be passed through, there will, of course, be no resonance.

The above paragraph assumes the coil is of the correct inductance. When an iron cored coil is used, but not set to the calculated inductance, successive adjustments of both coil and trimmer at each tuning limit must be made until the right coverage is achieved.

Air-cored coils, calculated from the same formula published in the "A.R." Data Sheet (May 1962) turned out close enough to require no adjustment, and iron-cored coils used later took about half an hour to line up.

It might be worth mentioning to those who have let their algebra develop parasites that you can't just decide against having fixed capacity and invent equations to suit your requirements; thus, substituting the condenser limits for C, we get

$$60L = 2128 \text{ for } 3.45 \text{ Mc.}$$

$$\text{and } 10L = 1665 \text{ for } 3.90 \text{ Mc.,}$$

then by subtracting the two equations, we find

L still comes out at 9.26 μH ., but it should be noted

$$\text{that } 60 \times 9.26 = 555, \text{ and not } 2128!$$

$$\text{and } 10 \times 9.26 = 92.6, \text{ and not } 1665!$$

The variable condenser should be of low value since this enables the highest possible ratio of L/C, a condition which leads to better performance, due to the higher dynamic circuit resistance. ●

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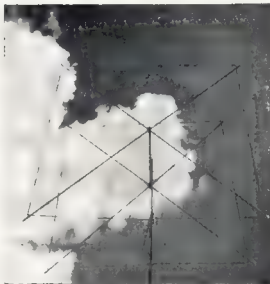
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A LOW COST S.B. TRANSMITTER

R. B. BENSLEY,* VK2XP

ONE of the difficulties in building a piece of equipment is how to convert the circuit diagram into an operating instrument. Obviously the first thing to do is to obtain a suitable circuit. However, if you analyse any circuit you will find that basically they all comprise a standard set of "building blocks," rarely does a new circuit present itself.

So I have come to the conclusion that providing correct wiring practices are followed, the essential point in building a circuit is the layout, or positioning of the individual parts. Of course if one is able to procure special components, then the layout can be simplified, but generally Amateurs use standard components. The use of disposals gear has made available to Amateurs parts that normally would not be available, at least not at such attractive prices.

The transmitter described uses parts which should be available, possibly from your "junk" box. (Wonder why the part used in the article you are following?) The description will detail construction practice, rather than describe circuit functions.

The basis is the chassis. Mine was made of 16 gauge steel by a sheet metal shop, who also drilled all holes in this 18" x 10" x 3 1/2" piece of metal.

All circuits are kept physically separate, so minimising the possibility of interaction between units. The crystal oscillator and the v.f.o. were built on separate chassis, that for the v.f.o. being obtained from the transmitter section of an I.F.F. set. The v.f.o. is mounted on the top-right front hand side of the main chassis assembly. It was constructed from various disposal items; the oscillator coil (ceramic) coming from an AT5 oscillator unit, and the dial from a TU5 tuning box. The EF50 valve is mounted on its side projecting from the v.f.o. chassis, inside of which is mounted all tuning gear.

A small sub-chassis, 4 1/2" x 2 1/2" houses the crystal oscillator, the crystal for which came from an old Command

transmitter. (Ham Radio, Hawthorn, may have supplies.) The output coil was made from an i.f. slug tuned transformer, which was cut down to size.

The carrier balance pots were mounted on the back of the main chassis. The balanced modulator stage was wired as the circuit diagram, with particular care being taken to ensure that all components were mounted

This system appeared to give better efficiency than any other yet tried.

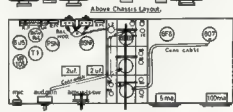
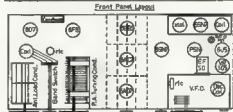
Audio is quite straight forward, but I used my a.m. pre-amplifier to feed into the 6J5. The driver transformer was one taken from a Command receiver. Across the centre of the main chassis is located the three-section Oak switch (mine was taken from a radar receiver). After all valve sockets have been wired, the various coils are fitted and set to the correct frequency using a g.d.o.

Check over all wiring to ensure that no errors have been made. Power can then be applied to the circuit and the station receiver used to set the rig on correct operating conditions. Listen to the transmitter signal and adjust the carrier balance pots until the carrier is reduced to its lowest attainable level. Set all coils exactly to frequency. A useful device is a low range microammeter and a diode, the unit connected as an absorption wavemeter. With the switch in the a.m. position you should be able to light a soup loop (a 150 mA. pea lamp with a small coil soldered across it) from the 8A67 output coil.

A c.r.o. is not required to align the audio, even though it is very useful. (I suggest that you read the article in Jan. 1980 "A.R." by VK2EL.) Plug in some audio and adjust the ratio control until it is correctly set. Having done this, you can connect an aerial to the 8A67 and you will be on s.b. with a reasonable signal. Trial and error, and on-the-air reports, will tell you which switch position provides you with upper or lower sideband.

The final p.a. is an 807 with a 6F6 clamp tube. This is, to my mind, a simple way of doing things, as it does not require any regulated screen or bias power supplies.

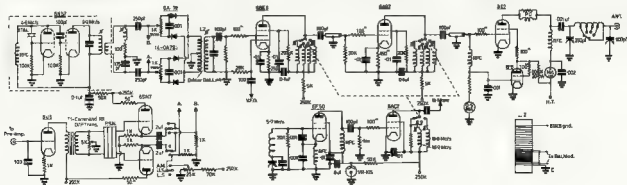
(Continued on Page 15)



Below Chassis Layout.

symmetrically. There is one thing which I did which I have not seen in any other circuit, namely the link coupling of the output coil from the balanced modulator. A bifilar wound coil with four turns each side being used. The grid coil side was resonant at 9.2 Mc. with a few pF. across it.

* "Girrahween," Dalton, N.S.W.



REMEMBRANCE DAY CONTEST, 1962

A handsome perpetual trophy is awarded annually for competition between States, inscribed with the names of those who made the supreme sacrifice, and so perpetuating their memory throughout Amateur Radio in Australia.

The name of the winning Division each year is also inscribed on the trophy. In addition, the winning Division will receive a suitably inscribed framed photograph of the trophy.

Objects

Amateurs in each Call Area (this includes those in Australian Mandated Territories and Australian Antarctica) will endeavour to contact Amateurs in all other Call Areas (VK1 and VK2 are to be considered to be in the one Call Area; likewise VK5 and VK6).

Date of Contest

Saturday, 18th August, and Sunday, 19th August, 1962.

Duration

From 1800 hours E.A.S.T., 18th August, to 1759 hours E.A.S.T., 19th August, 1962. A period of 15 minutes' silence will be observed by all stations on 18th August, immediately prior to the beginning of the Contest, when an appropriate broadcast will be made by the VK6 Division and relayed from the Divisional Stations

RULES

1. There shall be four sections to the Contest:—

- (a) Transmitting Phone.
- (b) Transmitting C.w.
- (c) Transmitting Open.
- (d) Receiving Open.

2. All Australian Amateurs may enter the Contest whether their Stations are fixed, portable or mobile, but only members of the W.I.A. are eligible for the awards.

3. All Amateur frequency bands may be used, but no cross-band operations are permitted.

4. Amateurs may operate on both phone and c.w. during the Contest (e.g. phone to phone, c.w. to c.w., or phone to c.w. and vice versa), but may submit an entry for one only of the above Sections listed in Rule 1.

An Open log will be one in which points are claimed for both phone and c.w. transmissions.

• The Federal Contest Committee of the Wireless Institute of Australia wishes all Australian Amateurs and Short Wave Listeners to participate in the Annual Contest which is held to perpetuate the memory of those Australian Amateurs who gave their lives for their country during World War II. It is held on the week-end nearest to 15th August, the date on which hostilities ceased in the South West Pacific Area.



Remembrance Day Contest Trophy.

A contestant transmitting on phone, but receiving on c.w. must enter for the phone section (and vice versa). Refer to Rule 11 concerning entry in logs.

5. Only one contact per station per band is allowed and arranged schedules for contacts on other bands is not permitted.

6. Only one licensed Amateur is permitted to operate any one station under the owner's call sign. Should two or more operate any particular station, each will be considered a contestant and must submit a separate log under his own call sign.

Contestants operating Club Stations other than their own shall be referred to, for the purpose of these Rules, as "substitute operators". Their operating procedure shall be as follows:

Phone contacts: Substitute operators will call "CQ Remembrance Day" followed by the call sign of the station they are operating and the word "log" followed by their own call sign.

C.w. contacts: Substitute operators will call "CQ RD de" followed by the group call sign comprising the call sign of the station they are operating, an oblique stroke, and their own call sign. Contestants receiving signals from a substitute operator will qualify for points by recording the call sign of the substitute operator only.

7. Entrants must operate within the terms of their licences.

8. Cyphers.—Before points may be claimed for a contact, serial numbers must be exchanged and acknowledged. The serial number of five or six figures will be made up of the RS (telephony) or RST (c.w.) reports plus three figures starting from 001 for the first contact and which will increase in value by one for each successive contact. If any contestant reaches 999, he will start again with 001.

9. Entries must be set out as shown in the example, using only one side of the paper, and wherever possible standard W.I.A. log sheets should be used. Entries must be postmarked not later than 17th September, 1962, and addressed to the Federal Contest Committee, W.I.A., Box 638, Brisbane, Qld.

10. Scoring will be based on the table shown:

SCORING TABLE

To

	VK0	VK1-2	VK3	VK4	VK5-8	VK6	VK7	VK9
From VK0	—	6	6	6	6	6	6	6
VK1-2	6	—	1	2	3	5	4	6
VK3	6	1	—	2	2	5	4	6
VK4	6	1	2	—	3	6	5	4
VK5-8	6	2	1	3	—	5	4	6
VK6	6	1	2	4	3	—	5	6
VK7	6	2	1	4	3	5	—	6
VK9	6	1	2	3	4	5	6	—

Note.—Read table from left to right for points for the various call areas.

EXAMPLE OF TRANSMITTING LOG

Date/Time E.A.S.T.	Band	Emission	Call Sign	RST Nr Sent	RST Nr Rcvd.	V.h.f Bonus	Points Claim.	—
Aug. '62								
18 1803	7 Mc.	A3	VK8XU	59081	—	—	—	—
18 2348	"	"	VK8RU	36005	—	—	—	—
19 1205	50 "	"	VK3OP	43088	—	—	—	—

Note. Standard W.I.A. Log Sheets may be used to follow above form.

EXAMPLE OF RECEIVING LOG (VICTORIAN S.V.L.)

Date/Time E.A.S.T.	Band	Emission	Call Sign Heard	RST Nr Sent	RST Nr Rcvd.	Station Called	V.h.f Bonus	Points Claim.	—
Aug. '62									
18 1803	7 Mc.	A3	VK8XU	59081	—	VK8XU	—	2	—
18 2348	"	"	VK8RU	36005	—	VK8RU	—	5	—
19 1205	50 "	"	VK3OP	43088	—	VK8PA	25	1	—

Note.—Standard W.I.A. Log Sheets may be used to follow the above form.

In addition a bonus of 25 points may be claimed for the first contact in each call area on 50 Mc. or above.

11. All logs shall be set out as in the example shown and in addition will carry a front sheet showing the following information:

Name	Section
Address	Call Sign
Claimed Score	

Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Signed	
Date

All contacts made during the Contest must be shown in the log submitted (see Rule 4).

Entrants in the Open Section must show phone and c.w. contacts in numerical sequence.

12. The right to disqualify any entrant who, during the Contest, has not observed the regulations or who has consistently departed from the accepted code of operating ethics.

13. The ruling of the Federal Contest Committee of the W.I.A. will be final. No disputes will be entered into.

14. Certificates will be awarded to the winners of the phone, c.w., open and receiving sections in each call area

(Northern Territory will count as a separate call area). There will be no outright winner for Australia. Further Certificates may be awarded at the discretion of the Federal Contest Committee.

The State to which the Perpetual Trophy will be awarded shall be determined in the following way.

To the average of the top six logs shall be added a bonus arrived at by adding to this average the ratio of logs entered to the State Licensees multiplied by the total points from all entries.

Example:

Average of the top six logs +
$$\left(\frac{\text{Logs Entered}}{\text{State Licensees}} \times \frac{\text{Total of Points}}{\text{from all Entrants}} \right)$$

Acceptable logs shall show at least five valid contacts.

The Trophy shall be forwarded to the winning State in its container and will be held by that State for a period of twelve months.

Note.—The F.C.C. emphasises the need for strict observance of Rule 9 in the Transmitting Section and Rule 3 in the Receiving Section.

RECEIVING SECTION

1. The Receiving Section is open to all Short Wave Listeners in Australia, but no transmitting station may enter.

2. Contest times and loggings of stations on each band are as for transmitting.

3. All logs shall be set out as shown in the example. Logs must show first the call sign of the station calling (not the station being called), the serial number sent by it and then the call sign of the station being worked. The scoring table to be used is the same as that used for transmitting and points must be claimed on the basis of the State in which the receiving station is located. A sample is given to clarify the position.

It is not sufficient to log a station calling CQ, nor is it permissible to log a station in the same call area as the receiving station.

For purposes of the Contest, VK1 and VK2 are considered to be the same call area, likewise VK5 and VK8.

4. A station heard may be logged once on phone and once on c.w. for each band.

5. Club receiving stations may enter for the Receiving Section of the Contest, but will not be eligible for the single operator award. However, if sufficient entries are received a special award may be given to the top receiving club station. All operators must sign the Declaration.

6. Awards. — Certificates will be awarded to the highest scorer in each call area. Further certificates may be awarded at the discretion of the Federal Contest Committee.

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The ability of a transformer or item of electronic equipment to function satisfactorily depends firstly on design. Our wide experience enables us to design efficient, economical units and our team of skilled engineers backed by extensive laboratory facilities are ready to assist you with your problems.

The illustration shows a plug-in type microphone pre-amplifier from a wide range of electronic equipment designed and developed in our laboratories.

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XTAL CALIBRATOR CIRCUITS USING TRANSISTORS

R. G. ROPER,* VK5PU

THE circuit of Fig. 1 is included mainly for interest only; an extremely high degree of stability can be achieved if the crystal is ground to frequency and the padder C removed from the circuit. Stability with C included for trimming to frequency is still quite high, but not all 100 kc. crystals can be thus trimmed without dropping out of oscillation.

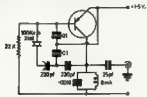


Fig. 8.

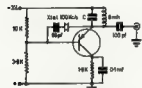


Fig. 3

Fig. 2 is a good general purpose oscillator circuit, with some interesting features. By varying C, fundamental, 3rd overtone or half fundamental operation is possible. With a 100 kc. crystal, and an OC71, fundamental operation only is possible. However, with an OC45, a 100 kc. crystal oscillates at—

- (1) 300 kc.—a few kc. (third overtone). $C = 208 \text{ pF.}$
- (2) 100 kc. (fundamental). $C = 880 \text{ pF.}$
- (3) 50 Kc. $C = 1,570 \text{ pF.}$

The division by two is exact, and 50 kc. checkpoints, crystal locked, with high harmonic content, are available.

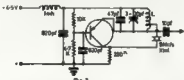


Fig. 3

For those interested in transistorised converters for home or mobile, the overtone oscillator of Fig. 3 is included. Circuit constants shown are for 27 Mc. operation (to give output in the b.c. range from a 10 metre mixer), but alteration of LC constants and emitter resistor (which controls feedback along with the coil tap position) makes this circuit good for any frequency up to 60 Mc. ●

tion, besides providing station addresses necessary for QSL cards.

Our copies direct from the publishers' O. Lund Johansen, and Technical Book Co. P/L., 295 Swanston St., Melbourne. Local price 31/- plus postage.

**SUPER RADIOTRON VALVE
MANUAL, RVM-4**

This publication, quarto size, of 118 pages, is published by Amalgamated Wireless Valve Co. P/L. It is an essential data sheet on the majority of receiving valves which have been divided into eight groups. Each page has the set of essential electrical characteristics relating to the valve, arranged in numerical order, commencing from type 00A. The opposite page then gives the valve base connections. Having used this manual for some time, it can be said that it is very concise, easy to use, and provides that data most needed for the designer. It is a pity that it is not your reviewer thinks that for more technical applications where other valve parameters are required, differing from those given, a conversion chart would be of assistance. These graphical charts enable the reader to establish operating conditions at differing electrode voltages.

One chapter provides a useful list of valve equivalents, but cannot list all possible combinations. Picture tube data will prove of value to the t.v. serviceman, as an interchangeability list is given. The field of semi conductors is covered by adequate data, and a very useful transistor interchangeability guide is provided.

For anyone requiring essential basic valve data and socket connections, this is a very useful book.

Our copy from A.W.V. Co. P/L., 47 York St., Sydney. Price 17/6 each.

RADIO AMATEUR'S HANDBOOK
(A.R.R.L.)

The 39th edition of this long established guide to Amateur Radio follows the layout of the past editions. This year, however, the publishers have changed their type face and paper quality, resulting in a cleaner appearance and a different feel to the book.

The twenty-five chapters cover, in broad principles, the facets of Amateur Radio based upon American practice. The main constructional articles have been reprinted from "QST" and are the best of their type. The five hundred and ninety pages cover every aspect of the Amateur, and a very comprehensive chapter provides valve characteristic data.

The chapter heads are: Electrical laws and circuits, vacuum tubes, semi conductors, h.f. receiving, h.f. transmitters, power supplies, keying, speed, amplifiers, a.m. s.b., transmission lines, antennae, v.h.f. receivers, v.h.f. transmitters, v.h.f. aeriels, mobile operations, construction practices, measurements, b.c.i. and t.v.i., station operating practices, and vacuum tube data. A large advertising section provides useful information.

This book has long been accepted as the Amateur's reference, and the new edition comes up to the standard set by previous editions.

Our copies from McGill's, 183 Elizabeth St., Melbourne, and Technical Book Co. P/L, 285 Swanston St., Melbourne. Price 51/6 plus 2/8 postage.

Book Review

THE AMATEUR RADIO HANDBOOK
(R.S.G.B.)

Every now and then a book appears which demands the very finest of recommendation, and such a book is the third edition of the R.S.G.B. Radio Handbook. The first edition was printed in 1938 and has sold some 190,000 copies.

This book is ideally suited to Australian practices, as the parts referred to are locally available and the G limit of 150 watts is the same as VK land. Thus this book could be written for Australia.

The chapters are: Fundamentals, valves, semiconductors, h.f. receivers v.h.f./u.h.f. receivers, h.f. transmitters, v.h.f./u.h.f. transmitters, keying, modulation, sideband, i.m., propagation, h.f. aerials, v.h.f. aerials, noise, mobile, power supplies, interference, measurements, operating techniques, R.S.G.B., general data, and an index.

It can be said that this book is the best book of its type yet read by your reviewer. It is thoroughly recommended to every Amateur, who will find a wealth of information, both technical and practical within its covers.

The circuit description of the h.f. communications receiver is worth the cost of the book, as it fully describes a unit which should equal any unit available today, and this receiver does need

specialised parts—all should be available locally.

The technical explanations are lucid, exact and very educating. In addition, clear circuit diagrams illustrate the book.

An excellent chapter covers single sideband theory and practices, plus details of suitable filters.

of an excellent Amateur book, but the best thing is for you to purchase a copy for your bookshelf. Every Amateur really interested in his hobby must have this book.

Our copy direct from the R.S.G.B. and the Technical Book and Magazine Co. P/L., 295 Swanston St., Melbourne. Local price 54/9 plus 3/6 postage.

WORLD RADIO T.V. HANDBOOK

This book lists the world radio and t.v. stations, providing programme data, station identifications, frequencies used, location, and hours of service. A schedule commencing at 2330 kc. proceeds to list every main s.w. station, including standard frequency stations, up to 25,900 kc.

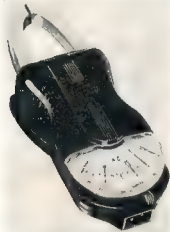
A mine of useful data is in this book which would be of use to the s.w.l. and anyone interested in a.w. stations. Some very interesting articles are included, one of which is radio communication via satellites.

The book commences, following the articles of general interest, with a listing of s.w. stations by countries, with Albania first. Reading this data provides some very interesting informa-

Trade Review

WESTON "CLIPPER"

Sangamo Weston announce through Warburton Franki Industries the release of the Western "Clipper", an easy to use compact and light weight clip-on a.c. volt ammeter designed for the electrician, maintenance engineer and serviceman.



Three voltage ranges (150, 300 and 600) and six current ranges (5, 15, 30, 60, 150, and 300) are provided on one clear easy-to-read scale approximately 2½" long. The "Clipper" is supplied complete with soft plastic carrying case and voltage test leads with insulated clips and accessory probes.

Full technical information is available from Warburton Franki offices in Queensland, New South Wales, Victoria, South Australia and in Western Australia from Tough Instrument Service Co.

LAG-65 AUDIO SIGNAL GENERATOR

Regrettably these days the term signal generator is applied to any piece of gear, which may or may not meet the specifications for a signal generator. This comment does not apply to the LAG-65 which is a precision piece of test equipment.

This apparatus generates, by a resistance bridge network, frequencies from 11 c.p.s. to 110 Kc., each frequency band being measured by a counting circuit, no calibrated dials are used. The output voltage is metered by a diode network connected into the input side of the precision output attenuator, which provides millivolt steps up to 1 volt across 600 ohms, in addition 0-10 volts are available across 10K ohms. The output is always monitored by the output meter, which, like the frequency meter, is a large four-inch clear view type. It was noted that at 100 c.p.s. the meter was resonant.

The unit uses seven tubes, weighs about 17 lbs. and is a compact, well designed, functional piece of gear, which can be fully recommended to anyone needing an audio frequency source with an accuracy of $\pm 1.5\%$ to 11 Kc., and

$\pm 3.5\%$ to 110 Kc., with a harmonic distortion of less than 0.1%. It forms part of an integrated line, which features a very wide variety of equipment.

Our sample from Electronic Industries Imports Pty. Ltd., 130 Bourke St., Carlton, who distribute these units for £37/14/0 plus tax if applicable. The price is subject to change.

THE BK-55 RECEIVER

This is an all-wave (540 Kc. to 30 Mc.) receiver using eight valves and rectifier. Electrical bandwidth is available for each Amateur band and a smoothly functioning tuning mechanism is used.

Excellent mechanical and electrical construction techniques result in a set which is simple to handle, but the Q multiplier setting is a little tricky until it is mastered.

A 6BA6 r.f. stage feeds the first detector, a 6BE6, which is fed by another 6BE6 used as the oscillator. A 6AV6 is used as the Q multiplier connected into the 1st i.f. stage which uses a 6BA6; in turn this feeds into the second i.f. (6BA6) thence to the 6AV6 detector. The audio output stage is a 6AQ5. The b.f.o. is taken from the Q multiplier, hence both cannot be used together. A most effective S meter is set into the tuning dial unit.

A full range of controls are provided in this communications receiver, all of which functioned smoothly and effectively. The function switch provides for standby operation, and acts as the Q mult. setting; selectivity being set by the Q mult. control. A b.f.o. pitch control is provided plus band selector, i.f. gain control, aerial trimmer, a.v.c./m.v.c., a.n.l., main tuning and bandspread tuning.



On-the-air tests showed that the unit was free from cross modulation, and had adequate bandwidth for Amateur use. Regrettably band conditions were very poor during the testing period, but this unit proved that it could match equivalent sets selling for higher prices. Stability and freedom from drift were very good, and a.b.c. could be resolved. The Q mult. proved effective.

Purchasing such a set may seem expensive, but if its re-sale value is taken into consideration, then the initial price is a lot less. This set is good value for the purchaser.

Our set from both Ham Radio Supplies, 3a Melville St., Hawthorn, and Electronic Industries Imports Pty. Ltd., Bourke St., Carlton. Prices available upon application.

TRAS MULTIMETER

This pocket size unit proves that compactness does not require poor finish nor the sacrifice of needed features. The unit has volts, d.c. and a.c. ranges covering from 6v. to 1200v. in five steps, at 20K and 10K ohms/volt sensitivity; in addition it has three ohm

ranges, and measures from 50 to 3000 H., and capacity from 0.001 to 0.2 μ F., thus covering the most needed inductance and capacity ranges.

A solidly made reliable unit which features excellent damping on the movement which was very well balanced. The price is attractive at £28½ plus tax if applicable.

Our sample from Electronic Industries Imports Pty. Ltd., address above.



LOW COST S.B. TRANSMITTER

(Continued from Page 11)

For the p.a., disposals equipment again provided many parts. A T.U.B. tuning unit provided the plate tuning condenser, r.f. choke, and the h.v. mica condensers, together with the p.t. tuning coil and the dials. The meters were taken from an AT5 unit and an old two-gang broadcast tuning condenser was used for the aerial loading position.

The power supplies are two 100 mA. power transformers rated at 385/0/385. The control circuits are wired so that the v.f.o. runs continuously and you only break the h.t. to crystal oscillator, the rest of the transmitter then going on stand-by.

Having built this unit you will find that you possess a simple yet effective s.b. rig capable of giving you many contacts. Already I have worked W, KH, ZL, VK0 (all on 20 metres), plus VK and ZL on 40 and 80 metres—not bad for 10 watts.

The main reason for writing this article was to show that it is possible to get going on s.b. without spending an extensive sum of money. My rig cost me a cash outlay of £25, mainly for the chassis, diodes and the P.S.N., the remainder of the parts coming from my own junk box. No doubt you will also be like myself and start thinking about a final to attach to this rig, then put the lot in a cabinet, and so possess a nice table-top s.b. rig alongside the station receiver. Good DX to you, too.



R.S.G.B. HON. CERTIFICATE MANAGER

The Council of the Radio Society of Great Britain has appointed Mr. K. A. W. Hurrell, G3VY, to the office of Honorary Certificate Manager of the Society in succession to Mr. G. E. Verrill, G3FC.

Claims for R.S.G.B. Certificates must in future be sent by registered post to R.S.G.B. Headquarters, 28/30 Little Russell St., London, W.C.1, for recording and acknowledgment. Cards must NOT be sent direct to the Honorary Certificate Manager.

After examination Mr Hurrell will return the cards to the claimant together with the appropriate certificate, provided the claim is in order.

If a claimant requires his cards to be returned to him by registered post sufficient extra money must be sent with the claim. R.S.G.B. certificates are issued free of charge to members of the Society and on payment of 7/- (6/9 Australian, \$1.00 American) per certificate to non-members. The Empire DX Certificate can only be claimed by those who have been Corporate members of the R.S.G.B. for at least three consecutive years up to the time of submitting the claim.

A leaflet setting out the rules of all R.S.G.B. Certificates and Awards and a List of British Commonwealth Call Areas can be obtained on application to R.S.G.B. Headquarters (address above).

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FEDERAL AND DIVISIONAL MONTHLY NEWS REPORTS

(SEND CORRESPONDENCE DIRECT TO DIVISIONAL REPORTER NAMED AT PARA. END)

FEDERAL

FEDERAL EXECUTIVE MEETING

The first meeting of the 1962-63 Federal Executive was held on 18th May. Present were W. Mitchell, VK3CQ (President), G. M. Hall, VK3ZS (Vice-Pres.), J. Lancaster, VK3JL (Sec.), D. Rankin, VK3QV (V.H.F. Manager), J. Macmillan, VK3CZ (Public Affairs Manager) and I. Macmillan, VK3CS (Publicity). Co-opted members present were W. Boase, VK3NI (Treas.), and G. Glover, VK3AG (Historian and Emergency Co-ordinator). Another member co-opted during this meeting was K. Cocking, VK3ZFG. Others not present were A. Tucker and T. Stroughton.

The transcript of the proceedings of the Federal Convention held in Perth at Easter was tabled, and it was decided that it would have to be corrected before copies were distributed to the States for ratification of the proceedings by the Divisions.

A copy of a letter from the Elizabeth Amateur Radio Club to the South Australian Division, which had been forwarded to F.E. for information, was tabled, and discussed. This letter criticised various aspects of the Institute, and while most of the matters were domestic in nature, some matters of a Federal nature were raised. These were:

(1) Veracity of articles published in "A.R." Every effort is made to ensure the correctness of articles published, but it is almost impossible for an over-worked voluntary committee to examine every detail of every circuit, and every question, or to pass on every article, except that are the subject of contention by experts.

(2) Short supply of Call Books. It is apparent that Divisions are reluctant to order large quantities of Call Books for fear that they may be left with a quantity. The VK3 Division prints on the basis of orders from the other Divisions, and known retail demands, and has to bear the cost of over-printing, they are reluctant to print them in a quantity decided by the VK3 Division.

(3) Novice Licences. This matter was recently brought to the attention of the Department again, and was rejected. However, the matter is not considered to be closed.

A letter from the N.S.W. Division, enclosing literature pertaining to that Division's excellent High School Radio Clubs scheme, was tabled, and it was decided to obtain a quantity of literature from N.S.W. for distribution to the other Divisions for their information, with the suggestion that they investigate the possibilities of duplicating the scheme, using basic material originated by the N.S.W. Division.

The scheme involves courses of instruction for High School students, with certificates issued on examination, in stages from an elementary level to a certificate at A.O.C.P. level, including "Novice Instructors' Certificate". Specific discussion of some fifty-five motions discussed at the Federal Convention is expected at the next meeting of F.E., which will have been held on 13th June.

OVERSEAS NEWS

By the time of issue, Oscar II, the second Amateur Satellite will be in orbit, and observations taking place. This satellite will be a duplicate of the first. A third Oscar package is planned for the future.

V.H.F. STATE REPORTS

New South Wales

144 Mc VK3JZ-JA1ANO, 4800m, 1/4/56

*144 Mc VK3ASZ-Z-21-3AQ, 1343m, 31/12/61

Mc McAlister

388 Mc and above: No claims.

Victoria

50 Mc VK3AL-ZKEFU, 8418m, 1/5/59

*144 Mc VK3ZCG-VK4HD, 897m, 27/12/61

252 Mc VK3AL-ZKTLZ, 922m, 30/1/60

576 Mc VK3AN-VK3JN, 10.1m, 13/12/60

2300 Mc VK3XA-VK3JAN, 9.0m, 18/2/50

Queensland

30 Mc VK3AG-JA1H8, 4140m, 22/1/56

*144 Mc VK3ZCG-VK3ZCG, 957m, 27/12/61

288 Mc and above: No claims.

South Australia

30 Mc VK3KI-W7AC8, VK3G, 5361m, 26/8/47

144 Mc VK3KI-W7AC8, 1523m, 30/12/51

252 Mc VK3AW-VK3ZCG, 212m, 23/1/61

576 Mc and above: No claims.

Western Australia

*50 Mc VK3BE-JA1RP, 5600m, 30/10/58

144 Mc VK3BD-VK3GL, 1322m, 30/11/51

288 Mc and above: No claims.

Tasmania

*50 Mc VK3HQ/TLZ-VK3DS, 2265m, —

*144 Mc VK3TLZ-VK3BC, 608m, 28/4/59

252 Mc VK3TLZ-VK3ALZ, 522m, 10/1/60

576 Mc and above: No claims.

*New Australians

144 Mc record.

Other contacts, no records, that have been submitted for recognition are as follows:-

144 Mc: VK3AH-ZL3AR, 1307m, 15/1/51

144 Mc: VK3ZAL, 1307m, 15/1/51

600m, 18/1/58

144 Mc: VK3BC-VK3TF, 571m, 28/4/50

NEW CALL SIGNS (MARCH)

VK— Australian Capital Territory

1JW—J. W. Miles, 2 Torres St, Red Hill

1JW—J. B. Waugh, 20 Hamelin Cres, Nar-rabundah.

1KG—K. G. Avery, 89 Haddon St, Dickson.

New South Wales

2CT—R. B. Pinney, 23 Rickard St, Narrimoo.

2NO—D. G. Hallam, 3145 Miro Cres, Rand-wick.

2PAO—T. R. Nolan, 14 Dennis St, Rydal-mere

2AUD—J. M. T. Davies, 100 Barrenjoey Rd, Mona Vale

2AVU—J. R. Copley, 46 Undercliffe Rd, Har-bord

2AYG—2 Pages, 55 Oakley Park Rd, Oakley Hill

2AYW—A. A. Brown, 35 Central St, Broken Hill

2ZDI—D. W. Rickard, 16 Glen St, Milsons Point.

2ZDI—M. K. Takacs, 6 Duke St, 314 Miller St, North Sydney.

Victoria

3CV—K. J. Duff, 18 Stanley Cr., Canterbury.

3KE—A. L. Heath, Main Rd, East Eltham

3RG—T. R. Russell, 1 Cedar Cr., Forest Hill

3JW—J. A. Perkins, 1 Parkmore Rd, Forest Hill

3WA—J. H. Walker, 27 Dundas Pl., Albert Park

3FW—F. W. Warner, C/o O.T.C., Albionville via Ballan.

3AYU—C. Lobb, 200 Elgar Rd, Box Hill South

3ZMN—R. K. Von Sanden, 43 Moyston St, East Hawthorn

3ZNE—R. W. Birrell, 33 Bakewell St, Bendigo

3ZOA—T. R. Powney, Anzac Ave., Leopold.

Queensland

4RX—B. R. Rickaby, 43 Curzon St, Tennyson.

4WY—W. S. C. West, 25 Rawlinson St, Mur-arrie.

South Australia

5CZC—C. A. Schabinger, 39 Miller St, Darling-ton

5ZNR—R. W. Haase, 18 Orlando Ave, Hamp-stead Gardens.

5ZIS—K. K. Kalar, 27 Mackay Ave, North Plympton

5ZJK—M. W. Lennan, 11 Herbert St, Chel-tenham

Western Australia

5AQ—Rev. Bro. V. R. McKenna, C/o Aquilas College, Manning.

5DX—R. R. Renfold, 35 Moulton Ave, Mt. Yelkine

5ZDN—J. S. Brown, 33 Reynolds Rd, Apple-cross.

Northern Territory

5CP—A. R. Jarmun, 10 Wallis St, Alice Springs.

Territory of Papua and New Guinea

5JB—J. Bohun, A.A.W.A. Ltd, Goroka Air-port Goroka.

AMATEUR ADVISORY COMMITTEE, 1962

New South Wales Messrs. W. Woodhouse,

VK3W, L. H. Taylor, VK3CL, N. MacNaughton,

VK3ZG, G. G. Hall, VK3AGH, B. H. Anderson,

VK3AD, Dr. L. J. McMahon, VK3AC

Victoria Messrs R. A. C. Anderson, VK3WJ;

F. P. O'Dwyer, VK3OP, N. L. Storck, VK3ZG

Queensland Messrs S. R. Bazler, VK3FJ,

C. I. Patterson, VK3VP; R. A. Collins, VK3ZG,

K. D. M. Grace, VK3G; C. E. Cogwell, VK3CI;

S. J. Armstrong, VK3AS.

South Australia Messrs K. M. Ring, VK3KH,

I. R. Frith, VK3ZG, L. Cotton, VK3LO, L. R. R. R.

P. R. Keddle, VK3ZG; C. A. Doddridge, VK3CD,

R. T. Manuel, VK3RT.

Western Australia Messrs. W. E. Coxon, VK-

BAG, M. Saw, VK3SM, J. E. Rumble, VK3RU,

R. C. Munn, VK3RY, S. Stewart, VK3ZAS

R. Graham, VK3ZDS.

Tasmania Messrs W. M. Nisbet, VK3BN,

L. Jensen, VK3LI; I. Nichols, VK3ZP, P.

McIntyre, VK3GV, C. Spiegel, VK3KS, S. Beard,

VK3ED.

The above-mentioned persons have indicated

that they have no objection to publication of

their names in the Institute's magazine "Am-

ateur Radio" as members of the Amateur

Advisory Committee

—

FEDERAL QSL BUREAU

A further change in the A.R.R.L. district QSL Managers is VZL QSL Bureau, Mr. D. E. McVittie, VZ4DX, 847 Academy Road, Winni-peg, Manitoba, Canada.

I am very grateful to member John Belcher, of Northgate, for forwarding available details of R.A.P. Receiver AR10, which was asked for in this column. Much appreciated, John.

Details of a new certificate issued by the Zulia Section of the Radio Club of Venezuela, are available from this Bureau.

An information sheet issued for the inauguration of the Club Radio Station of the International Amateur Radio Club has been received. The I.A.R.C. has been founded at the headquarters of the I.T.U., Geneva, Switzerland, and membership open to all club members of international organizations. Other licensed Amateurs may become members. The purposes of the I.A.R.C. are:

1. Through Amateur Radio, to further international friendship and understanding;
2. To co-operate with all Radio Amateurs associations;
3. To promote the proper use of the bands allocated to the Radio Amateur Service;
4. To provide the operation of the station which the I.A.R.C. radio transmitting and receiving station will be managed and operated.

The Amateur Radio Station of the Club has been installed in Room 527 on 8th Floor of the new building of the International Telecommunication Union, 11 rue de la Confédération, Geneva. The station has been assigned the call AU1TU in agreement with the United Nations and the Swiss F.T.T.

QSL traffic through the Federal Bureau rose to 5,822 cards for the month of May. This is the highest monthly total since November 1949!

Ray Jones, VK3RJ, Manager.

—

NEW SOUTH WALES

HUNTER BRANCH

The last meeting of the Branch was a "Do It Yourself" night when members described some items of equipment they had constructed. Some most interesting gear was displayed and those who performed were: Stewart ZAYF, Mac Stan ZKXZ, Keith ZKXZ, Les ZKXZ, ZKXZ, Gordon ZKXZ, and Keith ZAXX. As you can see, the list is quite long and to mention each one would involve a great deal of space. Suffice to say that practically all aspects except a.s.b. were covered with a goodly sprinkling of v.h.f. equipment. A very good roll-up of numbers and visitors, thirty-three in all, gained much useful knowledge from the evening. Thanks to all who participated.

News from the local front is at an all-time low this month and the rumour that several of our best known Amateurs have gone into hibernation may well be true. This certainly seems to be in evidence on Monday night broadcast time when very few call-backs are received. No matter how you are VK2 or Interstate, or ZL, please accept this invitation to call back to the Monday night re-broadcast of R.N. news. This may be heard each Monday at 1900 eastern time on a frequency of 293 kc on a telephony. The broadcast lasts about 20 minutes and call-backs are taken on the 10 minutes required. You may use a.m. or c.w. and you are assured of a cheery reply from the rostered Hunter Branch operator.

One member of the branch is known to be constructing a rig for use on top band and will be looking for contacts immediately.

after midnight on Sunday, 1st July. Top band offers great possibilities for local nets, especially during the winter months, and it is well worth considering getting on this band as soon as you can. Elaborate equipment is not needed and it is quite an easy job to modify an old rx to cover 1400 to 1700 kHz and give a number of Disposals rx's already cover the band and for a tx, ordinary h.c. rx components may be used. The 1400 kHz band is a very satisfactory job. So, what about it chaps? See you on 160 soon.

At the other end of the frequency spectrum we have been busy. The last 144 mhz. is a very tight band and is reported to be Bob JAQR from the shadow of NEN. His QTH was once called "shadow of Sugarloaf", but not now. That the new man has appeared, and the appearance of certain airworks I noticed the other day. It will not be long before a new notice board will be read. The last 144 mhz. When this happens, many local. Amateurs will breathe a sigh of relief. It should be possible to get the P.M.O. to agree to certain bands of signals, below which it is technically "in-audible". This will be a great help in those areas where a "picture" is received on perhaps one or two nights a week and the local Amateur gets the blame for everything else which appears on the screen.

Jim ZATX is not worried by t.v., at least not any more. He has now joined the ever-growing ranks of duck talkers and has built himself a new shack for the purpose. Between times at 2NXX, Tony is working on the new 2 mhz tx now that 288 is to have its life curtailed, and he may even be on the air by the time you read this. The last 144 mhz. from Cardiff has successfully completed a "Micromitter" and by all reports it is performing very well. Ian ZATX has trouble with modulation and is active only on c.w., and not very active at that. However he has successfully completed a new 2 mhz tx for 2ATZ, running about 35w. of a.m. phone. By all reports, this rig, with its still on test, is putting out a good signal. Stewart is reported to be active on 144 from the new shack. As he has a remarkably good take off spot for Sydney, some of you may be able to hear him. I have been able to receive a strong signal from ZATF. There is even a rumour that Bill ZCW will soon be active on 144 from the new shack. I have when I hear the signal. Varley ZSF is still having difficulty in putting the switch to the "net" position, but has been pretty busy on a very neat c.w. during the past few weeks.

Among the associates, Belmont Bob now has his ARS going well and is paying particular attention to it where I am fond of many good things. The audience of the ARS is growing. When one considers what Bob's ARS was like before Max, from Toronto, is getting some excellent practice on c.w. with the ARS signals and was responsible for maintaining a c.w. link with Ingleburn control during the recent flood scare. There are to be two new associates on the lakeside shores. Les Payne and Denis Matthews, from Marmont Point, have been regular visitors at recent meetings and will be keeping our ranks during the month. Les hopes to have a shot at the licence soon. Bill ZXT is after some Command I's of any frequency for a profit but has his mind on the net. He is able to help, get in touch with Bill.

If you have the time and you are able to drag yourself away from your income tax calculations, you should attend the next meeting. A single sidedband special, it is to be delivered by Keith ZBX. Having in mind the previous lecture has been heard from Bob, it is promised to be a good night, so put down the ready

YOUTH RADIO CLUBS

The N.S.W. Division has commenced a very promising project to encourage young people to take an interest in electronics and radio communications.

A very detailed scheme has been formed which will issue a proficiency certificate to those who pass the examination.

Every Radio Amateur in Australia should help to further this scheme by encouraging the young people to join.

Full test details are available upon application to R. C. Black (VK2YA), 21 Bardwell Road, Bardwell Park, N.S.W.

reckoner and come along. You'll find all the boys there at the Newcastle University College, Tighes Hill—the time, 8 p.m. Friday, 13th July. Let's not be superstitious! All the ladders, black cats and mirrors have been removed for the occasion. If you enjoy meeting the boys without being told that they come from the Bill Hall's Tavern, Cooks Hill, on 35th and join the billiards queue. And don't forget 160 mhz. See you there, ZJAXX.

BOORAGUI HIGH SCHOOL RADIO CLUB
Thanks to Ian, our new rig is now on the air with about 35w. on 80 and 40 mhz. We do hope soon to be on 20 and 160 mhz as well, which may take a little time. One of the good things about the main school building is that we are able to put up a half wave dipole for 160 mhz. The only thing we lack is the wire. Plenty of soft drawn copper is available but we are short of hard drawn wire round is for the big antenna. Preparations are well in hand for the Education Week open day and we hope that once again Booragui will be one of the really big net school clubs on the air. We are doing the best we can to maintain our lunch and afternoon schedule as listed last month. 5.21.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.18.19.20.21.22.23.24.25.26.27.28.29.30.31.32.33.34.35.36.37.38.39.40.41.42.43.44.45.46.47.48.49.50.51.52.53.54.55.56.57.58.59.60.61.62.63.64.65.66.67.68.69.70.71.72.73.74.75.76.77.78.79.80.81.82.83.84.85.86.87.88.89.90.91.92.93.94.95.96.97.98.99.00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15.16.17.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harmonics, turned up. Don't forget the next Eastern Zone family field day to be held at Lakes Entrance at the beginning of November 73. ZSCG.

NORTH EASTERN ZONE

To my knowledge 3GI is the only member making consistent DX contacts of late. 3AGG, the current dark horse, only smiles at the subject. 3AWT has erected a 35 ft. windmill tower close to his station to mount an as yet undecided type of beam. 3ALF suffers from inertia about the mounting of his 30 and 16 mK quad. 3AUL built up a new 15 mK converter recently, but has not heard any signals on it. The Zone chatterbox bombshell, he said would occur soon, has not gone off—maybe no fuse.

3AAQ had a spell of winding in order to achieve a heftier h.t. transformer. Using silicon rectifiers in a bridge circuit, he has jacked up input power to 88 watts. 3AVD has increased input power to 60 watts, there for a few days he was unable to obtain 100% modulation and all the highly technical tests did not reveal the "bug". Whilst idly poking at connections, he found a fatigued screen pin receptacle of one of the 867s in the Mod. Two days later he marked up his first DX phone contact—a VE. This calls for 807s all round next pay day?

3ZU reported that one member of the Yarravong and District Radio Club passed the theory and regs. in April. The last concerned is feverishly building 2 and 8 mK outfits and hopes to come on the air about mid June. 3ACK having finished his 3000 astro telescope, decided to have a lach at 2 m last month. The converter worked first try and the tx gave very little trouble. The other day when he first joined in the daily slide with 3CT and 3APF, Syd gave him an S point over Peter. The latter is quietly crunching through his pipe stem over that!

3ACD was not able to find sufficient interest among the Shepparton High School senior students so the idea of forming a radio club has, for the time being, been shelved. 3ZU has the answer to the cold weather and being away from Mum, he has transferred his outfit to the kitchen. During the last couple of weeks it, for the time being, has been shifted. 3ZU on 41 mK at about 1800 hrs., but I have never been able to sign off with them as their signals have faded right out in a matter of a few seconds.

The next Zone Convention looks like being held in Shepparton early in April 1983. 3ASY

WESTERN ZONE

Guess we must welcome back to our Zone Chas., ex VRIB. Chas. has only recently ar-

rived back with Audrey and 1st harmonic after a sojourn of three years in Gilbert Islands. They are at present living in Dinobooks and we expect to hear Chas on the air again soon from this location.

News of the Amateurs throughout the Zone seem to be active television enthusiasts. Believe that Keith 3AT3, of Murtio, has almost finished building his own tv set. Herb 3JN, of Annandale, has had the hard task of losing his highest antenna mast in a storm, so at present is operating under some difficulties. 12, 3ASW.

QUEENSLAND

FREQUENCIES

News in Queensland this past month seems to have been of nothing but frequencies, frequencies, and more frequencies. Discussions on the bands and in personal QSOs have been particularly sparked off by the Federal comment at the beginning of the last "A.R." The announcement of a re-issue of licenses which, by now should have almost been completed, was accompanied by the list of authorised frequency bands for Amateurs. Which was conspicuous by its cuts in allocations.

Besides the abandoning of the 80 to 82 Mc. and 380 Mc. bands, the little footnotes contained restrictions, which in effect will cripple service in a number of bands. Amateurs in Queensland were quick to realise the losses and a number have written personally to their local Federal members of parliament, while others have been urged to do so giving a full discussion of the issues involved.

Vince 4VJ has put forward a practical proposal to help some of those licensed almost exclusively knocked out by the announcement. He has given notice that at the next general meeting of the Queensland Division he intends to propose the following motion:

"That the Wireless Institute recommend to the P.M.G. Dept. that 2 licenses be granted use of a portion of the 30 to 30.2 Mc. allocation in lieu of the 30 to 29.7 Mc. recalled for Channel 6 t.v., and that 29 to 29.7 Mc. be considered for this purpose, other aspects of their licenses to remain unaltered."

Branches, clubs, and individuals were asked to notify the Divisional Secretary of their attitude to this motion at the next June 23, so it should not be too long before the result of the move is known. The V.h.f. Group in VK3 has been informed of the motion and asked for their opinion as members in Melbourne will be as badly off as those in Brisbane following the questionable decision on the controversial Channel 6.

OFFICIAL STATION

In a different vein on frequencies, the xials prepared for the VE2V1 to unfortunately were ground off frequency and over the past few weeks, there has been difficulty during the Sunday morning hang-up. Bert 4AO has now collected them and it's hoped to have the cure for correct frequency in service very shortly. To remind all Amateurs who operate on Sunday mornings, VK4V1 operates from 7100 to 7160 kc. for the news and after on 7105 kc. for the hook-up. As members are listening and taking notes in the form as from Brisbane as Townsville and Ayr, a sincere request is made for all operators not involved to keep these frequencies as open as possible, having regard to the particular conditions. In recent times, unthinking band users have almost wrecked both the news and the hook-up.

Also concerning frequencies, at least one Amateur in Brisbane was able to monitor one of the frequencies detailing the proposed first American high altitude nuclear blast which is in future. This was clear enough to be recorded so those looking out for freak conditions to accompany proposed explosions have no excuse of missing out. Oscar II, who was daily put into orbit from June and at least three v.h.f. members in Brisbane, State co-ordinator Vic 42W1, Dene 42AX and Lionel 42GL had picked up the signal in the first week. Although the project might be completed by now, all who heard signals are asked to contact Vic.

America's second astronaut Commander Scott Carpenter was in orbit in late May but no Amateur in Queensland is believed to have received signals on the one spectacular frequency released by Project Mercury officials, 15 Mc. No doubt many will be listening out for the next astronaut.

FIRST COUNCIL MEETING

The new VK4 Divisional Council held its first meeting on May 17 and the following were sworn in the positions decided: President and Chairman, Pat 4KE (a President back in

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of the W.A. Division, and as decided some time ago, one year's free subscription will be donated to mark the rapid progress that we are making in the West. It is the Rev. Bro. McKenna and, of course, we need to add to the time and effort of all those other new members who are coming along now.

I believe the S.E.C. has been busy down Katarung day away with the changeover d.t. to a.c. mains is proceeding rapidly and creating much jubilation and additional activity on the part of all. The time is passing and the old and the new are coming along. The S.E.C. is completely re-building his rig in readiness for the day when the changeover will be made.

As part from the low frequency a.c. Robbie EXR has been giving the high frequency a.c. a good going. The high frequency a.c. is not only works, but has stood up to the winter willy-willys which are frolicking around Katarung.

I have heard, too, that Herb EXO isn't satisfied with the S.E.C. anyway, and has built up a "spare" 150w. rig—just right for portable work at a barbecue or picnic. And don't think that Herb runs it off batteries either; a trailer mounted 2kva. diesel unit is the power source, thanks to your very much, and I'll bet there are some other operators as well. This sounds like a very good spot to start our W.I.C.E.N. organization being effective. Herb, Katarung, would make a very good regional center at the moment.

Prior to what is known as winter, hitting the West side you call this cold. Have you ever been in Melbourne in July? I believe it was a two weeks relative to Safety Day. I understand that the main reason for the relaxation before winter starts is so that Clarrie can play his piano usual for those 30 minutes.

Now what about some news from our other larger centres: Geraldine, Bunbury, Albany, and Newcastle. I have heard that the group of Port Hedland, Broome, Derby, Wyndham, have pen, will write!

Even mention of Meekatharra reminds me that Peter HPC has taken his life and by the time these notes are printed should be on his way, after training, to take up the post of the new good regional center at the moment, on Peter. Had speech with Roy ERY recently. Sounds as though Roy is working on another rx purchased recently. Anyway, he is disposing of his rx, so nothing to report.

Some considerable discussion has taken place recently with regard to the Sunday morning news service from VK6WL. The recent set-up was the SWI, operated by Wal EAG, distributed news and notes at 9.30 a.m. SWI then went portable to Dave SWT who had been treating us to various interesting articles in the past. Reports from country members in various centres and closed sometime during the morning.

Now that the service, which is more for country members than city, has expanded into a two-band broadcast, being done on 30 and 40 m, and the possibility of being re-broadcast on a v.h.f. band, the time taken for reports has gradually become longer and longer and going beyond the time nominally allowed by the P.M.G. Dept.

However, Dave SWI has agreed to take reports and queries on the broadcast after the session is over and as SWT can go on for as long as he likes before the time. Fine business, Dave, hope you can keep it up.

Incidentally, the Division has acquired an ABS tv very useful for our transmissions to the country members. Wal says it will be used to have so far been very gratifying. You should see this box of r.f., as well as hear it. In fact the box is a 2 ft. wide and 3 ft. high. Push buttons and meters, remote control, and cooling fan. All this now in one convenient to operate it. Wally's lights dim every time the main relay goes "clunk".

Believe it or not, my wife and I, and the kids, have been to Perth and all VK6 Midday and early afternoon has been the best time. 30 has been a bit intermittent, but VES has been very good. The kids have been very good. Just had word that the 6WL is all portable like, Type A Mark III, using 6V6 Helming modulation, centre tapped speaker transformer in circuit. Good work Lee, another W.I.C.E.N. possibility!

Don't forget the meeting night, third Tuesday, 10.30, open to all. Perth and all VK6. Country boys especially welcome. T3, G.S.

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TASMANIA

We extend our deepest sympathy to Bob TOM upon the death of his aged and very much respected father, Captain Harry O'May. During his long life, Captain O'May has left us all a rich heritage in the form of books published about ships and shipping in Tasmania. For those of us who have not had the privilege to read them, I can only recommend them to you, they are fascinating.

In the field of Amateur Radio, the most interesting of Bob's books is "Radio in Tasmania" undoubtedly the contact on 2 mhz between David TZAL on Mt. Wellington and Brian TZBE on Walker Lookout on King Island. This contact is all the more remarkable in that it is a communications gear used by Brian. Still talking v.h.f., the list of records supplied by the Federal Executive prior to v.h.f. affairs in respect of this Division, should undergo considerable expansion when claims are submitted for ratification. Both on 8 and 2 mhz, record will easily be topped.

At our July general meeting, we will be pleased to find a number of very comfortable chairs in our clubroom. We have to thank Ted TZF for "unearthing" these chairs at a very reasonable cost. Council has devoted a lot of time and effort to putting together copies of our Divisional constitution. All members can now obtain copies upon request.

Remember that the R.D. Contest is not far away. Try to get in early, make a list of names and submit a log. Our Division was third last year, with your help the trophy can return to us. The Federal Executive prior to v.h.f. affairs in respect of this Division, should undergo considerable expansion when claims are submitted for ratification. Both on 8 and 2 mhz, record will easily be topped.

Charlie TKS is re-building his aerial coupler to give him better signal, particularly on 2 mhz. Ted TZB is re-building his rig virtually from scratch, following the discovery that the 6168 in his final was only 80 per cent. efficient.

The "Future" of the Division is a subject matter was most lucidly presented and the important points were well made. Thank you Tom for a really interesting and informative address. T2Z

NORTHERN ZONE

The May meeting of this Zone was again above average attendance. The evening was successful meeting was held. After the business of the evening was concluded, TJF showed some interesting slides of the Hydro Electric Postina project.

A very pleasing angle on our meetings is the increasing number of associate members attending. These younger members are taking a keen interest in Amateur Radio and several of them are constructing equipment and receiving. The 144 Mc. band is now being watched regularly by some of these.

Visiting the Zone this month was Bryan TZBE, who left his car at TBQ's whilst he visited Alford. In the afternoon, the P.M.G. Department, Brian took 144 Mc. gear with him and with an output of 25w. has worked at Laureston, A.B. contacted at Postina (approx. 130 miles) and also to Mt. Wellington. Incidentally, what's left of his car is still at TBQ's, isn't it?

Bob O'May is also in the Zone at present and has found time to visit TBQ and TZL. Naturally the talk got around to Ham Radio in the "old days". Bob has been on the air about 40 years so he can certainly be classed as an "Old Timer" and an authority on the subject.

It is with deep regret that we must here record the death suddenly of Perc. Crawford. Perc., although not a licensed Amateur, took considerable interest in the Zone and was a member in this Zone who has not benefited by Perc's untimely death or guidance at some time or other. To his wife goes the heartfelt sympathy of all our members.

NORTH-WESTERN ZONE

It is regrettable that I have to report little activity this month. The question of the 144 mhz in this Zone is amazing. And to add insult to injury, attendance is falling off at our Zone meetings. At the last meeting, only 10 members attended. Why? Stir yourselves, chaps, and if you think the organisation worthwhile, come along. I hate to repeat myself, but I have certainly made inroads into our hobby.

THIS is busy soldering his rig into an airtight tin box, when he is not busy viewing. Went along to thresh out some technical problems with TXL the other night and finished up viewing a variety show. The pattern is much the same everywhere. TZL has opened up again from Wynyard and apart from a few initial surges is putting out an f.b. signal. TXL is heard consistently v.h.f. I can't find any other signs to report apart from TXL on a.s.b. Actually apart from the Postina boys, nothing much is heard of VKI on the bearable frequencies. Congrats to Harry GOW on getting his 2 call. No doubt this will spark off some v.h.f. activity and Harry and Bob can now work on a c.w. basis.

Lamentations on the band cuts, and I suggest that we fill the remnants to the full. Now that the air is descended once again, let us not be caught again. Use them, or lose them! It is up to you. I will report more news when someone creates some. T3, TZMX.

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SELL: Edystone 750, excellent condition and performance, £90 or best offer. Bendix LM10 Frequency Meter, good condition, original calibration book £25 or best offer. 80-10 mhz. Tx, Gelofo V.f.o., 6146 Gelofo pl coupler final, 6 mhz. T3 807 final, AB1 807s, Multimatch Mod. Tran., steel cabinet, £30. All enquiries answered. VK4RH, A. L. Hoey, M.S.T.4, Clifton, Qld.

SELL: Electro-Voice Cardioid Ceramic Microphone, Model 729, designed specifically for s.b. Also Dow-Key fixed tuned pre-selector. Both new and in original containers. Eccleston Electronics, 145a Cotham Rd., Kew, Vic. 80-3777.

SELL: "VK6GU Tri-band Beam," £20. 144 Mc. Crystal Converter, £10. 50 Mc. Converter, £9. 21 Mc. Converter, £8. Step-down Transformer, 240-110v., 1 kva., £6. Balun 75 ohms to 100 ohms (imported U.S.A.). £6/10/0. M. Hilliard (WX 2498), 57 Gardenia St., Blackburn, Vic.

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